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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/669,330	09/25/2003	Yukihiro Kumagai	500.38344CC2	4134
20457	7590	06/01/2004		
ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-9889				
			EXAMINER HUYNH, ANDY	
			ART UNIT 2818	PAPER NUMBER

DATE MAILED: 06/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/669,330

Applicant(s)

KUMAGAI ET AL.

Examiner

Andy Huynh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 September 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 3-5 and 7-9 is/are allowed.
- 6) ☒ Claim(s) 1 and 6 is/are rejected.
- 7) ☒ Claim(s) 2 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 09/525,029.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 09/25/03
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

In the Preliminary Amendment dated September 25, 2003, Applicant has amended the title and specification is acknowledged. Accordingly, claims 1-9 are pending in the application. This application is a Continuation of Application No. 10/255,714 filed 09/27/2002, U.S. Patent No. 6,639,263, which is a Continuation of Application No. 09/525,029 filed 03/14/2000, U.S. Patent No. 6,521,932.

Priority

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d) based on an application filed in JAPAN, 11-067840 on 03/15/1999.

Information Disclosure Statement

This office acknowledges receipt of the following items from the applicant: Information Disclosure Statement (IDS) filed on September 25, 2003. The references cited on the PTOL 1449 form have been considered.

Claim Objections

Claims 1, 3, 4 and 5 are objected to because of the following reasons.

In claim 1, "the main element" in the "wherein the main element of a material ..." should read --a main element--, and "a material" in the "wherein a material comprising ..." should read --the material--.

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In claims 3, 4 and 5, "the main element" in the "... including copper (Cu) as the main element" should read --a main element--.

In claim 5, "the shortest distance" in the "wherein the shortest distance between ..." should read --a shortest distance--.

Claim Rejections - 35 U.S.C. § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Shinkawata (USP: 5,717,236).

Regarding claim 1, Shinkawata discloses in Fig. 10 and related texts as set forth in column 14, line 50-column 17, line 56, a semiconductor device comprises:

a semiconductor substrate (1); and

a storage capacitor formed on a main surface side of the semiconductor substrate and being provided with a first electrode/a lower electrode (16), a second electrode/an upper electrode (22) and a capacitor insulation film/a high dielectric film (21) arranged between said first and second electrodes,

wherein the main element of a material (a barrier layer (15) and the lower electrode (16)) comprising at least one of the first electrode and the second electrode is selected from a group consisting of ruthenium, platinum and iridium; and

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wherein a material comprising at least one of the first and second electrodes includes at least one type of element selected from a group consisting of palladium, titanium, nickel and cobalt (col. 16, line 55-col. 17, lines 1-2).

Regarding claim 6, Shinkawata discloses the semiconductor device according to claim 1, therein said main element of the material comprising at least one of the first electrode and the second electrode is ruthenium (col. 16, line 64-col. 17, lines 1-2).

Allowable Subject Matter

Claim 2 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, since the prior made of record and considered pertinent to the applicant's disclosure does not teach or suggest the claimed limitations.

Shinkawata fails to teach the claimed limitation the semiconductor device according to claim 1, wherein a sum content of the selected elements is not less than 0.14 but not more than 25 at. %.

Claims 3-9 are allowed.

The following is a statement of reason for the indication of allowable subject matter:

Claims 3 and 7 are allowable over the cited prior art of Shinkawata fails to teach or suggest the limitation recited a semiconductor device comprises: a wiring conductor formed on the main surface side of the silicon substrate and including copper (Cu) as the main element; and a barrier metal provided so as to contact with a surface of the wiring conductor, wherein the main

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element of a material comprising the barrier metal is the same as the main element of a material comprising the upper electrode and/or the lower electrode as claimed in independent claim 3.

Claims **4 and 8** are allowable over the cited prior art of Shinkawata fails to teach or suggest the limitation recited a semiconductor device comprises: a wiring conductor formed on the main surface side of the semiconductor substrate and including copper (Cu) as the main element; and a barrier metal provided so as to contact with a surface of the wiring conductor, wherein the main element of a material comprising the barrier metal is the same as the main element of a material comprising the upper electrode; wherein the barrier metal contacts with the upper electrode in an upper electrode extending area outside of the area where the opposing lower electrode exists as claimed in independent claim 4.

Claims **5 and 9** are allowable over the cited prior art of Shinkawata fails to teach or suggest the limitation recited a semiconductor device comprises: a wiring conductor formed on the main surface side of the semiconductor substrate and including copper (Cu) as the main element; and a barrier metal provided so as to contact with a surface of the wiring conductor, wherein the main element of a material comprising the barrier metal is the same as the main element of a material comprising the second electrode; wherein the wiring conductor contacts with the second electrode in a second electrode extending area outside of the area where the opposing first electrode exists as claimed in independent claim 5.

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Conclusion

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andy Huynh, (571) 272-1781. The examiner can normally be reached on Monday-Friday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The Fax number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the -status of this application or proceeding should be directed to the receptionist whose phone number is (703) 308-0956.

AH

May 24, 2004



Andy Huynh

Patent Examiner